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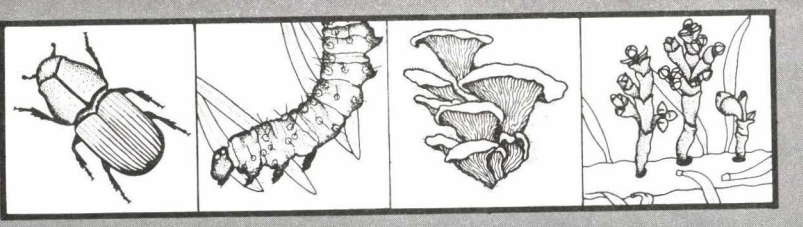

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PERMANENT MOUNTAIN PINE BEETLE POPULATION TREND PLOTS: AN UPDATE, 1981

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ABSTRACT

Six Montana areas in which permanent mountain pine beetle trend plots were established in 1979 were revisited in 1980. Results of the visit show infestation intensity decreased significantly in Centennial Valley, decreased slightly in the Madison River plot area, and increased almost threefold in the Murr Creek area. Beetle populations remained essentially static in Boulder Creek, Dunsire Creek, and near Spotted Bear.

INTRODUCTION

During the summer of 1979, we established permanent plots in six areas of Montana where mountain pine beetle populations appeared to be building in lodgepole pine stands (Gibson et al. 1980). We monitor these plots each year following beetle flight so information will be obtained concerning population trends of the beetle, impacts on affected stands, and stand recovery following the infestations. Such data will enable us to make more meaningful management recommendations to the land manager.

DISCUSSION

Following the 1980 beetle flight, we visited each of the six areas in which permanent plots had been established the previous year. These areas were selected to represent several mountain pine beetle infestations now epidemic in the State. They are Centennial Valley, BLM; West Fork Madison River, Madison RD, Beaverhead NF; Murr Creek, Plains RD, Lolo NF; Boulder Creek, Rexford RD, Kootenai NF; Dunsire Creek, Tally Lake RD, Flathead NF; and Cedar Creek, Spotted Bear RD, Flathead NF (see figures 1-7 in establishment report; Gibson et al. 1980).

Infestation intensity declined considerably in Centennial Valley. Newly attacked trees in 1979 averaged 47.8 per acre (table 1). Following beetle flight in 1980 attack density averaged 8.9 trees per acre (table 2). An explanation is readily apparent. Though the lodgepole component of the

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residual stand averages 214.3 trees per acre that are greater than or equal to 5 inches d.b.h. (diameter breast height), 94.9 percent of the trees are less than 9 inches d.b.h. The remaining lodgepole pine do not provide a food source sufficient to maintain a large beetle population. No doubt the larger trees will continue to be killed from year to year, but infestation intensity will probably not be as high throughout the remainder of this epidemic cycle as it was in 1979.

In the Madison River plots, the infestation trend declined from an average 8.8 trees killed in 1979 to 5.6 in 1980. In that area, 166.3 green lodgepole per acre greater than or equal to 5 inches d.b.h. remain. Of those, 65.5 percent are less than 9 inches d.b.h. Slightly more than one-third of the remaining green lodgepole are in the high hazard class (with respect to diameter). Therefore, we anticipate that the infestation will continue to increase in intensity over the next few years.

The largest percentage increase in beetle-caused mortality occurred in the Murr Creek plots on the Plains RD. Though trees killed in 1980 averaged only 9.6 per acre, that was nearly a threefold increase over 1979. In those plots, 60.5 percent of the remaining green lodgepole greater than or equal to 5 inches d.b.h. are less than 9 inches d.b.h. Here, too, more than one-third of the remaining stand is of a size susceptible to the beetle. We likewise expect an increase in infestation intensity in that area.

At Boulder Creek, Dunsire Creek, and Spotted Bear, the infestation level fluctuated only slightly and, by definition, remained in virtually an endemic status. In the Boulder Creek plots, average number of trees killed declined from 0.8 per acre in 1979 to none in 1980. Those at Dunsire Creek rose from none in 1979 to 0.5 in 1980. A similar slight increase was observed at Spotted Bear; no attacks recorded in 1979, 0.7 per acre in 1980. Remaining green stands for those areas are shown in table 2. The percentage of the stand in the higher risk category varies: 20.2 percent at Boulder Creek, 47.6 percent at Dunsire Creek, and 35.5 percent at Spotted Bear. With nearly 80 percent of the remaining green trees between 5 inches and 9 inches d.b.h., those plots at Boulder Creek are the least likely to experience a large increase in beetle populations. We expect populations to reach epidemic proportions in the other two areas within the next few years.

CONCLUSION

The permanent plots at these six locations were established prior to beetle flight in 1979. By back dating infested trees according to foliar conditions, we were able to obtain accurate mortality estimates back to 1977. (Mortality prior to that date is collectively referred to as "older dead.") Therefore, we now have reliable estimates of beetle-caused mortality for 4 years. We plan to maintain these plots for 3 to 4 years more in order to more accurately chart the course of a mountain pine beetle infestation through lodgepole pine stands of certain characteristics. This will greatly enhance our recommendations for the management of beetle populations in lodgepole pine.

Table 1.—Permanent mountain pine beetle trend plots in Montana - prior to beetle flight, 1980.
Mountain pine beetle mortality in lodgepole pine

Area		1979 attack	1978 attack	1977 attack	Older dead	Total MPB dead	Other bark beetle mortality	Unknown mortality	Total standing dead	Percent MPB mortality
Centennial Valley	T/A 1/	47.8	13.5	9.9	4.2	75.4	28.4	3.0	106.8	71
	BF/A 2/	1,057.7	446.4	549.8	114.8	2,168.7	68.2	—	2,236.9	97
Madison River	T/A	8.8	14.9	4.2	3.8	31.7	38.4	9.3	79.4	40
	BF/A	497.3	703.8	285.1	38.3	1,524.5	86.9	—	1,611.4	95
Murr Creek	T/A	3.6	4.2	2.6	2.8	13.2	11.1	10.9	35.2	38
	BF/A	45.9	88.0	47.2	113.2	294.3	—	142.3	436.6	67
Boulder Creek	T/A	0.8	0.0	0.0	0.0	0.8	3.7	19.6	24.1	3
	BF/A	—	0.0	0.0	0.0	—	—	48.5	48.5	0
Dunsire Creek	T/A	0.0	0.6	0.0	0.0	0.6	2.6	32.5	35.7	2
	BF/A	0.0	121.8	0.0	0.0	121.8	58.9	418.7	599.4	20
Spotted Bear	T/A	0.0	1.0	0.3	1.1	2.4	5.9	38.3	46.6	5
	BF/A	0.0	102.1	59.4	106.6	268.1	102.8	236.5	607.4	44

Table 2.—Permanent mountain pine beetle trend plots in Montana - prior to beetle flight, 1980.
Mountain pine beetle mortality in lodgepole pine

Area		1980 attack	1980 strip	1980 pitchout	Total MPB mortality	Other beetle mortality	Unknown mortality	Total standing dead	Percent MPB mortality	Remaining green LPP ≥ 5"
Centennial Valley	T/A 1/	8.9	0	0	84.3	0	0	115.7	73	214.3
	BF/A 2/	44.9	0	0	2,213.6	0	0	2,281.8	97	834.8
Madison River	T/A	5.6	0	5.4	37.3	0	0	85.0	44	166.3
	BF/A	360.1	0	127.3	1,884.6	0	0	1,971.5	96	2,063.8
Murr Creek	T/A	9.6	0	2.5	22.8	0	0	58.0	39	311.0
	BF/A	112.3	0	—	407.1	0	0	549.4	74	5,260.6
Boulder Creek	T/A	0	0.6	0.5	0.8	0	0	24.1	3	267.7
	BF/A	0	48.5	50.1	—	0	0	48.5	0	4,351.4
Dunsire Creek	T/A	0.5	0.6	1.3	1.1	0	0	36.2	3	178.1
	BF/A	53.2	51.3	94.8	175.0	0	0	652.6	27	8,280.3
Spotted Creek	T/A	0.7	0	0	3.1	0	0	47.3	7	233.2
	BF/A	46.2	0	0	314.3	0	0	653.6	48	7,866.8

1/ Trees per acre
2/ Board feet per acre

REFERENCE

Gibson, K. E., M. D. McGregor, and D. D. Bennett.
1980. Establishment report: permanent mountain pine beetle trend plots, Montana, 1979. USDA-Forest Service, Northern Region, S&PF, FPM, Rpt. No. 80-8, 15 pp.